Description of muTr Calibration DAQ and Analysis Procedures – MJL – 10/7/04

DAQ

- on phnxrc@phoncsc:mutr/calib/
- the shift-person is supposed to initiate this whole thing (by using docalib.pl) at least once a day when the beam or HV are off and normal data taking not taking place.
- docalib.pl – Perl/Tk GUI to control calibration of either arm
    - calib1.pl – Perl script called by above for init, each of 13 DAC values and finishing up. For each 13 runs:
        1. Set calibration system amplitude & packets user words using calib.c program
        2. Then use RC to take >100 event run
    - prdf file names are recorded in the file filelist_xx_yy_zz.txt
    - After a successful end it puts "tag" name into newcalibS.txt or newcalibN.txt (which is the signaling file to the automatic analysis, see below)
    - And last call getTemp.csh to readout and check FEM/Glink temperatures, voltages, currents and put in mySQL database

Automatic Analysis

- On phnxmutr@va032 in ~/calib
- cauto (cautoped) – cron jobs (one for south, one for north) run every 5 minutes and look for newcalibX.txt files in the DAQ directory (above). When one is found it initiates an analysis automatically by calling docalib.
- docalib (doped) – csh script to analyze a set of calibration runs for a muon arm (south or north)
    - sets LD_LIBRARY_PATH to get working libraries
    - makes a sub-directory for this analysis using the "tag" name
    - get filelist_xx_yy_zz.txt from DAQ directory
    - calib.C (quick.C) – root macro to analyze all data for calibration & produce threshold files
    - plot.C – root macro to plot calibration results
    - mon/… - comparison macros/programs to compare these results with results from previous calibrations & make some plots
    - check.pl - sanity checks before recording anything in db
    - copy new threshold files to $DCM_THRESHOLDS/mutr.s or mutr.n
    - update database
    - update results & histograms on Web via Samba mount of /phenix/WWW
    - email results to leitch (& others)
    - call dobits.csh which analyzes calibration prdf files for stuck bits
        - in directory ~/dobits/ using dobits.csh, check_mutr.C and check_stuck_bit

Analysis Code Overview

- code in CVS @ Development/online/calibration/Run3/subsystems/mutr/

- calib.C – macro called by docalib (or calibX.C where X is S or N)
  - load libraries: libonlreco.so & libMutCalib.so
  - create MutCalib object
  - initMappingObj or txtGetFullMap – get channel mapping
  - getPreviousCalibration – get most recent previous calibration results
  - txtputMap
  - process_tag
    - loop over 13 prdf files
    - process_run
      - process_event – stores adc values internally
    - calcCalibVal
      - calc avg
      - calc rms
      - calc for DAC=0
        - thresh = (avg-nrms*rms-0.5) ^ 0xfff
  - writeThreshFiles – write out thresholds into files formatted for DCM's
  - rootPutInfo
  - fit – fit for pedestal, linear and non-linear gain vrs input pulse size (DAC) description
  - txtPutCalib – put resulting desription for each of ~22k channels/arm in text file
  - writeROOTFile – write ntuple that's useful for debugging or looking at more detail
- building libMutCalib library in phnxmutr@va032:mjl/oncal/
  - presently using new.3